Syracuse University

BioInspired Institute

The Opportunities and Challenges of Center Grants

February 1, 2023

Overview of workshop

- Definitions and rationale
- Center grant solicitations relevant to BioInspired
- Highlights of the challenges
- Team Science: the mindset, how to enhance
- Discussion
- (Resources)
- (BioInspired Seed Grant information)

What is a center grant?

Supports **shared resources and facilities** for synergistic research/programming by **a number of investigators** from different disciplines who provide a multidisciplinary approach to **a joint research effort** or from the same discipline who focus on a common research problem.

Why do we want one?

- Money: research and equipment
- Prestige
- Positive feedback loops
  - Federal funding
  - Publications
  - Industry
  - Education

~ 1 trainee per PI/sr. personnel per yer

Relevant Opportunities (Centers)

- Center:
  - NSF MRSEC, competitions every 3 years. (2025 next)
  - NSF Engineering Research Center (ERC), competitions every 2-3 years (2024-2025 next).
  - NSF Biology Integration Institute (BII), competitions every 2 years (2025 next).
  - NSF Science and Technology Center, competitions every 2-3 years (2024-2025 next).
  - NSF Physics Frontier Center, competitions every 3 years (2025 next).
  - NIH P01 Research Program Project Grant, deadlines vary by NIH institute.
  - DOE Energy Frontier Research Center (EFRC), every 3 years (2023 next).

Relevant Opportunities (Multi-investigator)

- Multi-investigator
  - NSF Designing Materials to Revolutionize and Engineer our Future (DMREF), biannually.
  - NSF Emerging Frontiers in Research and Innovation (EFRI), annually.
  - NSF Future Manufacturing (FM), annually.
  - Keck Foundation Research Grants, twice annually.
  - DOD Multidisciplinary University Initiative (MURI), annually.
  - NIH Collaborative Program Grant for Multidisciplinary Teams, twice annually.
  - *Future opp*: Advanced Research Projects Agency for Health (ARPA-H).

Materials Research Science and Engineering Center (MRSEC), NSF

- MRSEC “addresses research of a scope and complexity requiring the scale, synergy, and multidisciplinarity provided by a campus-based research center”
  - Address a fundamental materials science topic in Division of Materials Research (DMR)
  - 2-3 Interdisciplinary Research Groups, IRGs (8-12 people each)
  - $1.5 M/yr/IRG
    - Travel to annual meeting @NSF

Biology Integration Institutes (BII), NSF

- The Biology Integration Institutes (BII) program supports collaborative teams of researchers investigating questions that span multiple disciplines within and beyond biology.
  - “The institute must have outcomes that are greater than the sum of its parts”
  - “an explicit plan for integration, both among research projects and across disciplines”
  - robust, integrated education and training component
  - $15 M over six years ($2.5 M/yr)
    - Travel to annual meeting @NSF

Multidisciplinary University Initiative (MURI), DOD

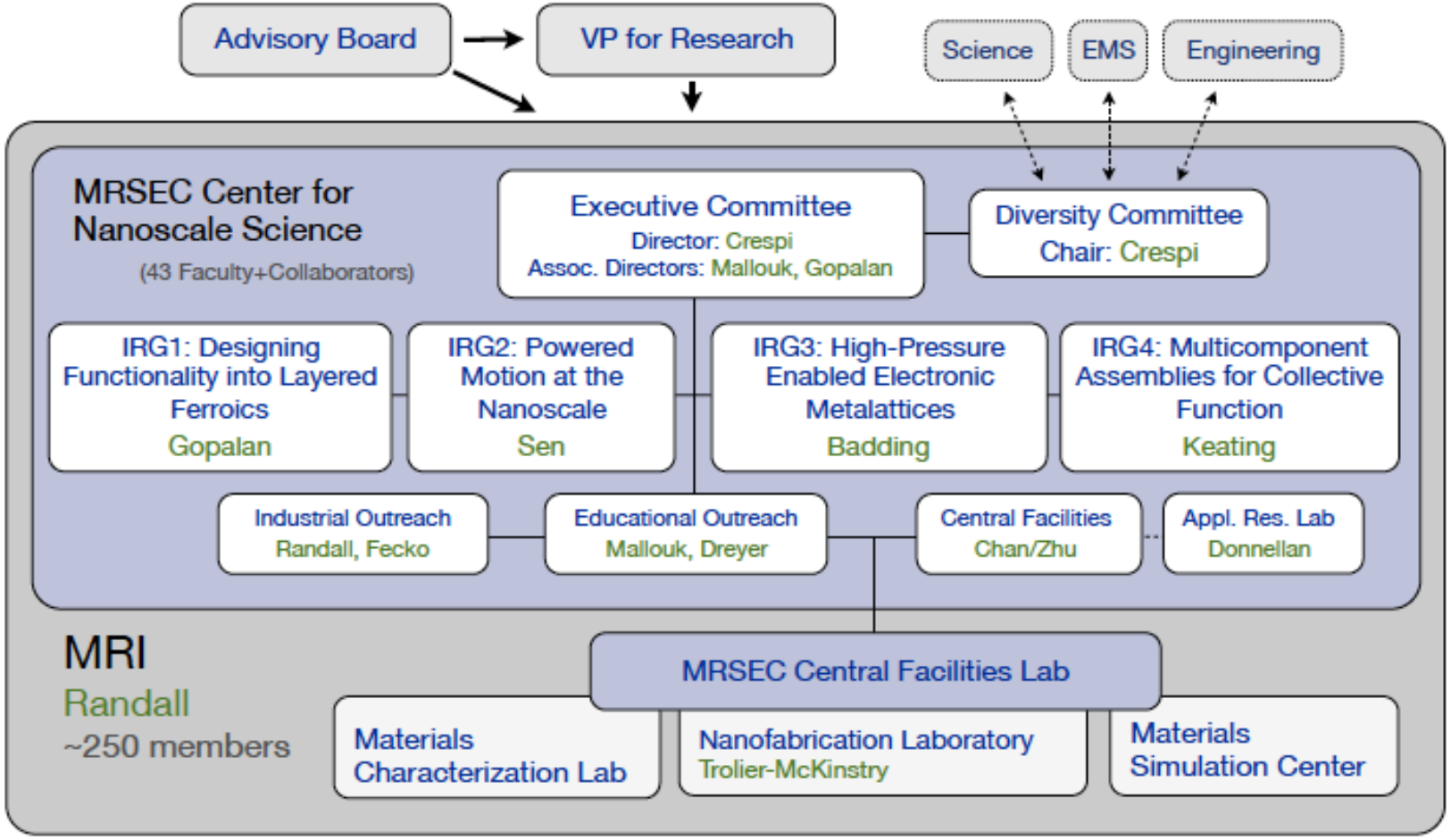
- Addresses high-risk basic research and attempts to understand or achieve something that has never been done before
- MURI projects are closely managed by program officers and they provide research guidance
- Multi-investigator requirement to provide necessary expertise in addressing multiple facets of the topics
- Typical annual funding per grant is $1.25M to $1.5M. 3-5 years. 25-30 awards
- Multiple topics every year in one Broad Agency Announcement (BAA) - it's easy to miss a relevant topic
- White papers not required but strongly recommended - talk to PO before submitting!

New components: Management Plan

Describes both administrative and scientific elements

- Participant roles and leadership structure – organizational chart

PSU MRSEC Org Chart



New components: Management Plan, cont.

Describes both administrative and scientific elements

- Participant roles and leadership structure - organizational chart
- Expectations for team member interactions (meeting frequency, participants, agenda)
- Plans for participant accountability
- Procedures for conflict resolution
- Authorship guidelines
- Project deliverables and milestones (e.g., Gantt chart)
- Metrics for assessing project progress & for acting on assessment results
- Plans for adapting to challenges & opportunities

Team science

Project management

Interdisciplinary Proposals: new components

- **Assessment and Evaluation:** describes both administrative and scientific elements
- **Intellectual Property (IP)**: agreement between lead and partners on the management of IP, strategy for licensing or transition of IP to the market
- **Industry Partnerships**: facilitate movement of technology to the market
  - Industry should be involved early and in multiple areas to ensure researchers are aligning research output with industry needs
- **Cooperative Agreements** vs Grants
  - “substantial [Federal] staff involvement”

Interdisciplinary research (NAS definition):

A mode of research by teams or individuals that **integrates** information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are **beyond the scope of a single discipline** or area of research practice.

Foster a collaborative environment

- Bring people together around a theme for cross-talk through:
  - Centers/institutes/initiatives, offices, programs with an interdisciplinary theme/focus
  - Informal meetups
  - Structured events - speed dating, collaborative collision
- Incentivize: *seed funding*

BioInspired Institute

Center grants: positioning a team for success

- Establish a **track record of collaboration** (i.e., publications)
- Create a funding plan for the team/initiative/center/institute
  - Map team's expertise/research interests to funding opportunities
  - Use the identified opportunities to pursue smaller opportunities together in order to establish a history of smaller grants with team members
- Develop a clear, compelling vision for the interdisciplinary grant
  - *This takes time*

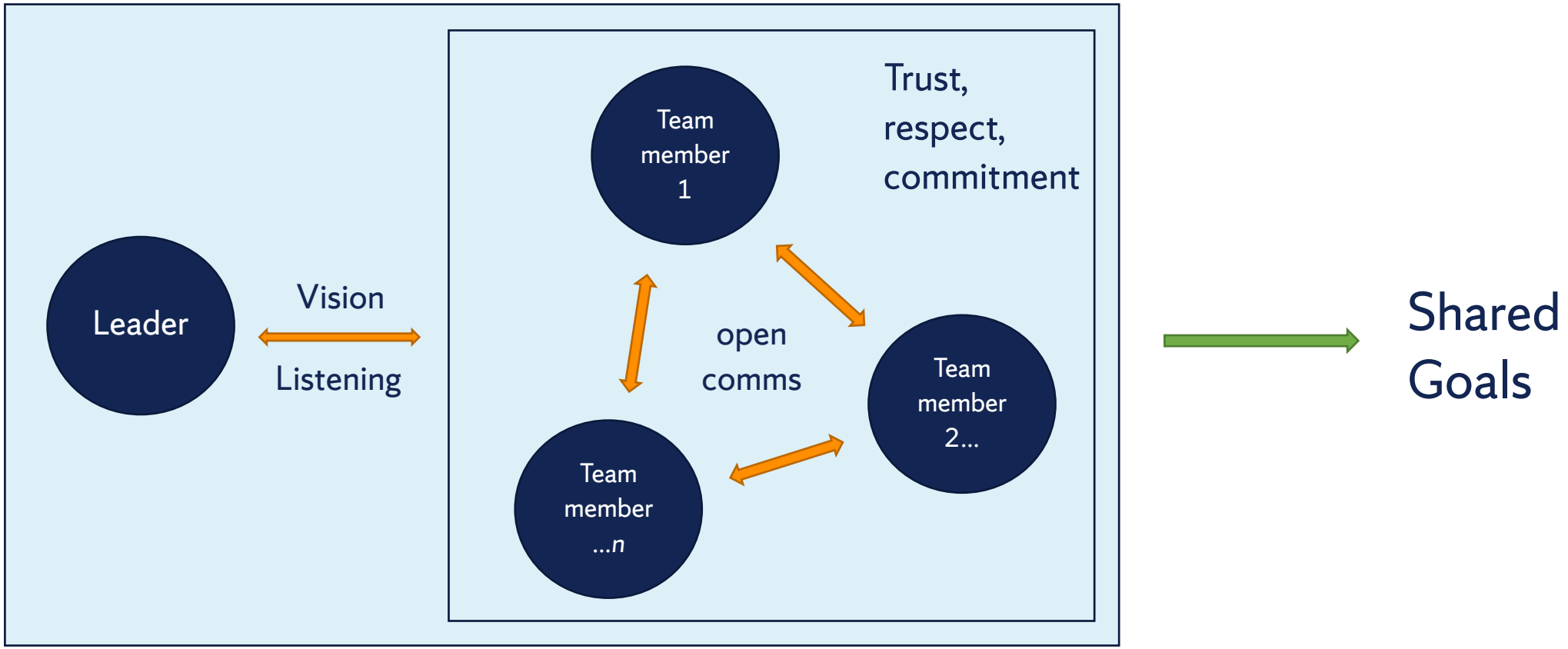
Interdisciplinary Research Takes Time

- Extra time required initially to learn new methods, languages, and cultures
- Need time to develop a clear, compelling shared vision
  - May take extra time to build consensus given the need to integrate disciplinary perspectives
- Make adjustments to team composition as required by adjustments to vision / objectives
  - *This is difficult!*

Principles of Good Interdisciplinary Teamwork (1)

- Leader provides vision, while also listening to team members
- Team members are comfortable with listening and with speaking out
- Team members understand the team's shared objective/goal & their individual role
- Team members have developed trust
- Team members are committed, reliable, and have mutual respect

Principles of Good Interdisciplinary Teamwork (2)



Pragmatic Guidance

- Develop common ground, shared goals, and increased social cohesion
  - Regular team-wide meetings
  - Social events, retreats, and other opportunities for face-to-face & informal exchange
- Members committed to timeline, milestones, and deliverables
  - Communicate delays
- Construct and re-affirm an organizational climate of sharing
  - (information, credit, and decision-making responsibilities)

Mitigate Transaction Costs

- **Transactions costs:** Large interdisciplinary collaborative efforts may require frequent communication/meetings to coordination, data sharing, etc across disciplinary (and possibly institutional) boundaries

- Mitigate the costs by
  - Choosing user-friendly communication tech
  - Carefully/efficiently planning meetings and emails

Team Science Resources (1, start here!)

- Northwestern University Team Science. https://www.teamscience.net/ Learn how to perform team-based translational research through a series of free, on-demand learning modules.
- Pennsylvania State University Clinical and Translational Science Institute's Team Science Toolbox. https://ctsi.psu.edu/research-support/team-science-toolbox/ Evidence-based content tailored toward novices of team science. Review practical and relevant team knowledge that addresses common team needs including but not limited to team-based interventions and metrics to assess team processes, climate, and effectiveness.
- University of California - Irvine. https://tsal.uci.edu/ Team Scholarship Acceleration Lab at UCI provides resources to facilitate team scholarship and research.
- Mendeley Science of Team Science Library. https://www.inscits.org/scits-library First launched in 2013, The reference library in the "Science of Team Science (SciTS)" public group on Mendeley constitutes the most comprehensive and authoritative source of empirical literature on team science and scientific collaboration in the world.

Team Science Resources (2)

- Attributes of Interdisciplinary Research Teams: A Comprehensive Review of the Literature. 2012. Lakhani J, Benzies K, and KA Hayden. *Clin Invest Med* 35(5): E26-265.
- *Collaboration and Team Science Field Guide.* 2018. Bennett ML, Gadlin H, and Marchand C. U.S. Department of Health & Human Services | National Institutes of Health. https://www.cancer.gov/about-nci/organization/crs/research-initiatives/team-science-field-guide/collaboration-team-science-guide.pdf
- *Collaborative Collision: An Innovative Approach to Interdisciplinary Networking*. Mike Mitchell, Dr. Rachel Goff-Albritton, Beth Hodges Poster presented at National Organization of Research Development Professionals 2018 Conference: https://www.nordp.org/assets/RDConf2018/presentations/nordp-2018_conf-poster-mitchell.pdf
- *Collaborative Collision 2.0. https://www.research.fsu.edu/research-offices/ord/collaborative-collision/about-collaborative-collision/*
- Developing Center Proposals: Establishing Synergy Beyond Disciplinary Boundaries. 2012. Pramanik P, Deckard L. National Organization of Research Development Professionals 2012 Conference. https://www.nordp.org/assets/RDConf2012/presentations/nordp-2012-pramanik.pdf
- *Enhancing the Effectiveness of Team Science.* 2015. National Research Council, Committee on the Science of Team Science, N.J. Cooke and M.L. Hilton, Editors. Board on Behavioral, Cognitive, and Sensory Sciences, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
- *Enhancing Communication and Collaboration in Interdisciplinary Research.* O'Rourke M, Crowley S, Eigenbrode D, and Wulfhorst JD (Eds). Thousand Oaks, CA: Sage Publications

Team Science Resources (3)

- *Facilitating Interdisciplinary Research*. 2005. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. Washington, DC: The National Academies Press.
- *Facilitating Convergence Through Dialogue: The Toolbox Dialogue Method*. Michael O'Rourke. National Organization of Research Development Professionals keynote
- Fostering interdisciplinary research in universities: a case study of leadership, alignment, and support. 2015. *Studies in Higher Education* 40(4): 658-675
- *Leading large transdisciplinary projects addressing social-ecological systems: A primer for project directors*. 2017. Eigenbrode, S. D., T. Martin, L. Wright Morton, J. Colletti, P. Goodwin, R. Gustafson, D. Hawthorne, A. Johnson, J. T. Klein, L. Mercado, S. Pearl, T. Richard, and M. Wolcott. Edited by Emily Smudde. https://nifa.usda.gov/leading-transdisciplinary-projects
- Sparking Partnerships and Fanning the Flames of Collaboration: Diverse Approaches to Research Team Development and Support. Sorensen P, Jenkins M, Meier N. 2019 National Organization of Research Development Professionals Conference
- *Speed Dating for Researchers Proves Successful for Exchange of Ideas.* Morelli K. 2018. https://www.usf.edu/business/news/articles/180910-speed-dating-researchers.aspx
- *Strategies for Planning, Developing, and Writing Large Team Grants*. 2016. Cronan M. Academic Research Funding Strategies, LLC.
- Ten Principles of Good Interdisciplinary Teamwork. 2013. Nancarrow SA, Booth A, Ariss S, Smith T, Enderby P, and A Roots. *Human Resources for Health.* 11:19
- The Ideas Lab Concept, Assembling the Tree of Life, and AVAToL. Collins T, Kearney M, Maddison D. *PLOS Currents Tree of Life*. 2013 Mar 7. Edition 1.
- *Toolbox Dialogue Initiative: The Power of Cross-Disciplinary Practice*. 2020. Hubbs G, O'Rourke M, and Orzack SH (Eds.) CRC Press
- What is Team Science? Division of Cancer Control and Population Sciences. https://cancercontrol.cancer.gov/brp/research/team-science-toolkit/what-is-team-science

Help with Follow-up?

- Sign up now for BioInspired logistical support
  - Scheduling
  - Meeting space

- Office of Proposal Support Services
  - Proposal management of large, complex proposals
    - Setup of Teams for file sharing
    - Document templates
    - Strategic planning

BioInspired FOA Parameters

- Teams of 3-6
  - Any departments or fields
  - May include SUNY Upstate and ESF faculty (two total from each)
- Up to $60k for 12-24 months
  - Up to $30k from each Upstate/ESF (same or different projects)

Center grant target: You choose!

- Identify a likely funder and solicitation
  - Demonstrate interest to the funder
  - Demonstrate a pathway to a proposal for the team and BioInspired
- Team would be part of an IRG, not the entire thing
- Bonus: identify extramural partners, including private industry and/or government

Timeline

Deadline!

January 11, 2023	**RFP release date (application system live)**
February 1, 3-4 pm	Workshop on Center Grant Opportunities and Challenges
March 13, 2023	Proposals due, early submission encouraged
March 6-31, 2023	Proposals compiled and submitted to reviewers for desk review
April 1-7, 2023	Desk review completed and compiled for Review Panel
April 10-14, 2023	Review Panel meets and recommends projects for approval
April 17-19, 2023	Award announcements emailed to lead PIs, Deans, and ADRs of lead PI. It is the lead PI's responsibility to notify her/his Co-PIs.
May 1, 2023	Projects start
May 31, 2024	Annual report due
May 31, 2025	Final report due (for NCEs of 12-month projects) Annual report due (for 24-month projects)
April 30, 2026	Final report due (for NCEs of 24-month projects)

Application Components

- Narrative (4 pages)
  - Introduction and Key Personnel
  - Rationale and Significance
  - Approach
  - Table of Trainees
  - Plan to leverage BioInspired funding
- References (no limit)
- Budget Justification (2 pages)
  - May be distributed among the PIs or to fund a shared resource (i.e. postdoc)
- CVs, to include current & pending (up to 5 pages)

Evaluation Criteria

- Overall merit of the application (20%)
- Qualifications of proposed project personnel and adequacy of facilities (10%)
- Potential success for funding as a component of a center grant (30%)
- Benefits of a multi-investigator, interdisciplinary approach (30%)
- Potential for advancing diversity and inclusion (10%)

Developing Interdisciplinary Proposals

- The business of developing the vision & objectives requires lots of conversations
  - These discussions are what enables the interdisciplinary team to understand the big picture and how the pieces of the larger project fit together / interact / synergize
  - Once the vision and objectives are settled, then cycle of writing and feedback begins
  - Make adjustments to team composition as required by adjustments to vision / objectives

Successful Interdisciplinary Teams

- Purpose (that everyone has agreed to)
- Collaboratively set measurable goals
  - Clear goals promote open communication
  - Open communication => team strength, cohesion, efficacy
- Effective leadership
  - Clear direction
  - Shared power
  - Listens to team members
- Communication (face to face/virtual, email)
  - Sharing ideas and expertise, building trust, building consensus => team strength and cohesion
  - Dealing with conflict (interpersonal, or related to tasks or processes) effectively
- Cohesion/camaraderie
- Mutual respect/valuing team members' contributions
- Communication, listening, respect promotes feeling of psychological safety